UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,004	01/18/2002	Agnes Y. Ngai	END901039US1	8921

30400	7590	08/24/2005	

HESLIN ROTHENBERG FARLEY & MESITI P.C.
5 COLUMBIA CIRCLE
ALBANY, NY 12203

EXAMINER
CZEKAJ, DAVID J

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *27 April 2005*.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-62* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-62* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *18 January 2002* is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments with respect to claims 1-62 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

2.   The drawings are objected to because in figure 8A, the examiner understood "Toral" to be "Total". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1-12, 15-32, 35-52, and 55-62 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Keesman et al. (5805220), (hereinafter referred to as

"Keesman") in view of Uz et al. (5764293), (hereinafter referred to as "Uz").

As for claims 1 and 42, Keesman teaches of employing multiple encode

processes to encode multiple streams of video frames in parallel (Keesman: Figure 1,

Reference numbers 12 and 62); exchanging at least one input statistic or encode

statistic (i.e. complexity which is the product of the number of bits and the average step

size (i.e. quantization)) between the encode processes; dynamically adapting encoding

of at least one stream of video frames of the multiple streams of video frames based on

relative complexity of the video frames comprising the multiple streams of video frames

employing the at least one input statistic or encode statistic exchanged between the

encode processes (Keesman: column 3, lines 23-27. Note: complexity modifies the

target value). However, Keesman fails to disclose the direct communication between

encoders as claimed. Uz teaches that an important aspect of a video encoder is rate

control (Uz: column 4, lines 4-6). To help maintain the rate, Uz discloses "directly

exchanging encode process to encode process" (Uz: figures 1A and 1B, wherein the

direct communication is between the master and slave units which are shown to contain

encoders). Therefore, it would have been obvious to one having ordinary skill in the art

at the time the invention was made to take the apparatus disclosed by Keesman and add the direction communication taught by Uz in order to obtain an apparatus that can effectively control the output rate of a bitstream.

As for claim 2, Keesman teaches of providing an exchange interface between the multiple encode processes wherein said exchange interface facilitates said exchanging of said at least one input statistic or encode statistic between the encode processing (Keesman: column 3, lines 23-27. Note: the exchange interface is the adjusting circuit 5).

As for claims 3, 24, and 43, Keesman teaches of providing dedicated data and control buses between the multiple encoders for facilitating said exchanging of the at least one input statistic or encode statistic (Note: Keesman's Figure 1 shows dedicated data lines between 14 and 51 and between 64 and 52 and dedicated control buses between 56 and 19 (T1) and between 57 and 24 (T2)).

As for claims 4 and 44, Keesman teaches of employing a joint rate control strategy distributed among said multiple encode processes (Keesman: Column 3, Lines 23-26).

As for claims 5, 25, and 45, Keesman teaches of multiplexing resultant compressed video streams output by said multiple encode processes onto a constant bit rate channel (Keesman: Figure 1 shows multiplexer 3 multiplexing the two outputs into a single bit-rate (T) channel).

As for claims 6, 26, and 46, Keesman teaches of partitioning of said constant bit rate channel capacity among said multiple encode processes (Keesman: Column 3, Lines 18-21).

As for claims 7, 27, and 47, Keesman teaches of buffering output of each encode process of said multiple encode processes in a respective encode buffer prior to said multiplexing, and allowing expanded upper and lower bounds in at least one encode buffer when a new bit budget is allocated in its respective encode process, wherein an amount of data unloaded by each encode process from its respective encode buffer is a function of a total output of said multiple encode processes at any instance in time and said constant bit rate channel capacity (Keesman: Column 4, Lines 5-20).

As for claims 8, 28, and 48, Keesman teaches of exchanging individual encoder statistics to allow determination of a total statistic corresponding to a sum of the at least one input statistics or encode statistics generated by said multiple encode processes (Keesman: Column 3, Lines 46-47).

As for claims 9, 29, and 49, Keesman teaches of one encode processes uses both its own statistic and the total statistic to dynamically adapt the stream of video frames (Keesman: column 3, lines 46-54. Note: the dividers 54 and 55 compute a relative complexity for each encode processes, which is its one statistic divided by the total statistic).

As for claims 10, 30, and 50, Keesman teaches of all encode processes uses both its own statistic and the total statistic to dynamically adapt the stream of video frames (Keesman: column 3, lines 46-54. Note: the dividers 54 and 55 compute a

relative complexity for each encode processes, which is its one statistic divided by the total statistic).

As for claims 11, 31, and 51, Keesman teaches of all encode processes uses both its own statistic and the total statistic to dynamically adapt the bit rate of the stream of video frames (Keesman: column 3, lines 55-67. Note: the bit rate (T_n) is adapted using the above described relative complexity).

As for claims 12, 32, and 52, Keesman teaches of one encode processes uses its own statistic to dynamically adapt the bit rate of the stream of video frames (Keesman: column 3, lines 55-67. Note: the bit rate (T_n) is adapted using the above described relative complexity).

As for claims 15, 35, and 55, Keesman teaches of said statistic being one of: frame activity, bit count, quantization, and inter-pixel difference (Keesman: column 3, lines 23-37. Note: aforementioned statistic is a combination of bit count and quantization).

As for claims 16, 36, and 56, most of the limitations of the claim are contained in the above rejection of claim 1. Keesman also teaches of at least one characteristic thereof comprising at least one of an intra-frame characteristic or an inter-frame characteristic (Note: Keesman derives complexity which is higher for intra-frame and lower for inter-frame, Column 4, Lines 21-67).

As for claims 17 and 57, Keesman teaches of providing an exchange interface between the multiple encode processes wherein said exchange interface facilitates said exchanging of said at least one input statistic or encode statistic between the encode

processing (Keesman: column 3, lines 23-37. Note: the exchange interface is the

adjusting circuit 5).

As for claims 18, 37, and 58, Keesman teaches of employing a joint rate control

strategy distributed among said multiple encode processes (Keesman: Column 3, Lines

23-26).

As for claims 19, 38, and 59, Keesman teaches of multiplexing resultant

compressed video streams output by said multiple encode processes onto a constant

bit rate channel (Keesman: Figure 1 shows multiplexer 3 multiplexing the two outputs

into a single bit-rate (T) channel); partitioning of said constant bit rate channel capacity

among said multiple encode processes (Keesman: Column 3, Lines 18-21).

As for claims 20, 39, and 60, Keesman teaches of process of said multiple

encode processes ascertains said information derived on the at least one characteristic

of its respective stream of video frames, saves said information, and shares said

information among said multiple encode processes during said exchanging to allow

determination of a total statistic corresponding to a sum of the information derived on

the at least one characteristic by each encode process of the multiple encode

processes (Keesman: column 5, lines 1-6. Note: sum on the bottom of equation 6).

As for claims 21, 40, and 61, Keesman teaches of sharing the total statistic

among the multiple encode processes, wherein at least one encode process employs

the total statistic and its own information during said dynamically adapting encoding to

facilitate said dynamically encoding of the at least one stream of video frames of the

multiple streams of video frames (Keesman: Column 5, Lines 1-6).

As for claims 22, 41, and 62, Keesman teaches of controllable encode parameter comprises a bit rate employed by at least one encode process of said multiple encode processes (Keesman: column 6, lines 1-13. Note: equations show the bit-rate which is used).   .

As for claim 23, most of the limitations of the claim are contained in the above rejection of claim 1. Keesman teaches of a distributed joint rate controller (Keesman: Column 3, Lines 23-26).

5.   Claims 13-14, 33-34, and 53-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keesman et al. (5805220), (hereinafter referred to as "Keesman") in view of Uz et al. (5764293), (hereinafter referred to as "Uz") in further view of Nam et al. (5617150), (hereinafter referred to as "Nam").

As for claims 13-14, 33-34, and 53-54, most of the limitations of the claims are contained in the above rejection of claim 12, 32, and 52. Keesman does not teach of said modifying done at a group of picture boundary or scene change in the stream of video frames being encoded by said at least one encode process, however, Nam does (Nam: column 5, lines 49-61. Note: Nam teaches that when a scene change or end of sub-gop occurs the bit rate can effectively be changed). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to detect scene change or end of gops because in most cases the frame immediately following the aforementioned processes will result in a frame that requires a larger bit-rate (i.e. and I or P frame).   .

Conclusion

5.   Applicant's amendment necessitated the new ground(s) of rejection presented in

this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

    A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

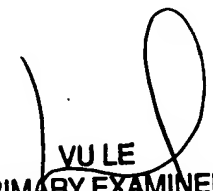than SIX MONTHS from the date of this final action.

    Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Dave Czekaj whose telephone number is (571) 272-

7327. The examiner can normally be reached on Monday - Friday 9 hours.

    If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone

number for the organization where this application or proceeding is assigned is 703-

872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

DJC

VU LE
PRIMARY EXAMINER

8|19|05